NAVAL POSTGRADUATE SCHOOL
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A SIMPLIFIED SCHEME
TO PERFORM PRICE ADJUSTING SAMPLING
FOR QUALITY ASSURANCE

by

William Paul Keane

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A Simplified Scheme to Perform Price Adjusting Sampling for Quality Assurance

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ABSTRACT

This thesis presents a quality assurance scheme which eliminates the necessity of rejecting lots. The mechanism used to motivate suppliers to provide lots at an acceptable quality level is to adjust the price paid for the lot based on the results of a sample. Information contained in Military Standard 105D and a concept referred to as Price Adjusted Single Sampling are combined in order to develop a system which allows a decision maker to find a sampling plan by selecting three parameters.

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I. <u>INTRODUCTION</u>

The traditional method of specifying an acceptance sampling plan for quality assurance has been to identify the number of items to be inspected, which is referred to as the sample size, and the acceptance number. The acceptance number is defined as the maximum number of unsatisfactory items in the sample which still allows the entire group of items, or lot, to be accepted. If the results of the sampling process indicate that the lot is acceptable, a predetermined fixed price is paid to the supplier for the entire lot. If the lot is judged unacceptable, and therefore rejected, it is returned to the supplier without payment. There are instances, however, when rejecting a lot is not feasible. This thesis examines an alternative method of using the results of the sampling process to determine a variable price to be paid for a lot in consideration for each lot being accepted.

As a result of direction from the Office of Management and Budget, OMB Circular No. A-76 [8], agencies of the federal government have begun preparing for an increase in the amount of commercial and industrial services being performed by private contractors. Many of the services to be contracted are required on a regular basis, such as

janitorial work or bus service. For a service the term <u>item</u> is defined as a scope of work or task. For example, in janitorial work a trash basket is emptied or not emptied, a floor is waxed as required or it is not, or in general, the task is accomplished in a satisfactory or unsatisfactory manner. For bus service an item could be a scheduled stop which would be satisfactory if made within required time limits. Using this definition of an item, the term <u>lot</u> is defined as the number of items which the customer expects to receive over a given period of time, e.g., the number of emptied trash baskets or the number of scheduled stops in a month. From a practical viewpoint, unacceptable lots of this kind cannot be rejected and returned to the contractor. Military Standard 105D furnishes a wide range of sampling plans for general use; however, in this context the standard does not appear to be adequate or appropriate. An alternative sampling scheme directed towards determining how much to pay for a lot needs to be developed. A possible scheme will be presented in this paper.

In the next chapter we will develop the idea of expected price paid per satisfactory item and examine the relationship of this price to sampling plans in Military Standard 105D.

Price Adjusted Single Sampling (PASS) was originally introduced by Joseph Foster [4] and subsequently developed by

Foster and Oscar Perry [5] and [6]. It is a generalized procedure to find a sampling plan consisting of a sample size and a formula to compute payments based on the number of unacceptable items found. In Chapter 3 the mathematics of this procecure will be reviewed in detail with particular attention being given to those items critical to the development of the proposed sampling scheme.

In later chapters equations necessary to create a simplified sampling scheme are developed. Then using an arbitrary set of parameters and attempting to duplicate the simplicity of the Military Standard, a model scheme is constructed. A discussion of the sensitivity of the scheme to changes in the parameters is followed by a set of recommendations for further study.

II. EXPECTED COST PER SATISFACTORY ITEM

Expected cost per satisfactory item, C(p), is an important idea utilized in creating the sampling scheme presented in this paper. After a brief review of Military Standard 105D, it will be shown that Military Standard 105D exhibits an interesting relationship between C(p) and acceptable quality level, AQL.

A. MILITARY STANDARD 105D

Military Standard 105D has been a widely used set of sampling plans since being issued in 1963. In order to use Military Standard 105D, it is necessary to know lot size, N, and to have designated an "acceptable quality level," or AQL. The AQL is set by the customer and is defined as the percent of defective items (in a lot) which the customer considers acceptable. Under plans from Military Standard 105D, lots having AQL quality will be accepted with a high probability. It is also necessary to decide on an "inspection level" which determines the relationship between lot size and sample size.

Although Military Standard 105D provides sets of double and multiple sampling plans, we shall be primarily concerned with single sampling. Each single sampling plan in the standard provides a sample size, n, and an acceptance

number, A_c, depending on the type of inspection in effect, either normal, tightened, or reduced. Criteria are provided in the plan to shift from one type of inspection to another, depending on the experience with previously inspected lots. These shifts will result in the values of A_c and/or n being changed.

It has been stated that "Military Standard 105D plans are not based upon cost concepts" [1]. This is, at least, an arguable point since the rules for using the standard allow the consumer to adjust the amount of sampling done per lot in relation to lot size by choosing a level of inspection consistent with cost considerations. However, by another criterion, Military Standard 105D does involve cost, i.e., expected cost per satisfactory item.

B. EXPECTED COST PER SATISFACTORY ITEM

Expected cost per satisfactory item, C(p), is defined as follows:

$$C(p) = \frac{\Pr\ (\text{accept lot}\,|\,p)NC'}{N(1-p)} = \frac{P_a\ C'}{1-p} \; . \tag{1}$$

Here C' is the contracted price paid for each item in an accepted lot.

To illustrate the relationship between C(p) and p, data was taken from the table for normal inspection contained in Military Standard 105D. The AQL's 1.0, 1.5, 2.5, 4.0, 6.5, and 10.0 were chosen as the area of interest. In order to

use available tables of cumulative binomial probabilities [7], sample size was restricted to 50, 80, and 125. Using these tables to determine the probability of acceptance, P_a, for a given p, inserting the results into Equation (1), and letting C' equal 1.0 led to the values shown in Table I.

As can be seen, the value of p which tends to maximize C(p) is the AQL. This behavior becomes more evident as AQL increases and as sample size increases.

Since it could be argued that normal inspection is only part of the overall sampling scheme set forth in Military Standard 105D, an analysis was done to determine if shifting among normal, tightened and reduced inspection would have similar results. In order to do this, tables contained in a paper by Gerald Brown and Herbert Rutemiller [1] were used. These tables yield an acceptance probability, P_a, based on AQL, p and n, which accounts for shifts between types of inspection. For the current investigation values of n were restricted to the three largest available in the Brown paper for each given AQL. Again letting C' equal 1.0 and using Equation (1), the values in Table II were computed.

As can be seen by comparing Tables I and II, the results are consistent in that C(p) is maximized at the AQL. It does not seem likely that this result was an objective when the standard was developed but, rather, is

a fortunate byproduct. It is intuitively appealing that suppliers should be encouraged to provide lots close to AQL quality. This suggests that a sampling scheme could be developed which uses the idea of maximizing C(p) at the AQL.

TABLE I

C(p), Relationship Between Expected Price Per Satisfactory Item, and Incoming Percent Defective, p, Using Military Standard 105D, Normal Inspection

	AQL 1.0%				AQL 1.5%		
	p	P_a	C(p)		p	P_a	C(p)
n = 50				n = 50			
	0	100.	1.0		0	100.	1.0
	.3	99.	.993		1.0	98.6	.996
	1.0	91.1	.920		1.7	95.0	.966
	2.0	73.6	.751		2.0	92.2	.941
					3.0	81.1	.836
n = 80				n = 80			
	0	100.	1.0		0	100.	1.0
	.6	99.	.996		2.0	100.	1.020
	1.0	95.3	.963		3.0	99.9	1.030
	2.0	78.4	.800		4.0	98.8	1.029
					5.0	95.1	1.001
					6.0	86.9	.924
n = 125				n = 125			
	0	100.	1.0		0	100.	1.0
	.7	99.	.997		1.0	99.8	1.01
	1.0	96.3	.973		1.4	99.0	1.004
	2.0	75.9	.774		2.0	96.0	.980
					3.0	86.6	.850

TABLE I (Continued)

	AQL 2.5%				AQL 4.0%		
	p	P_a	C(p)		p	P_a	C(p)
n = 50				n = 50			
	1.0	99.9	1.009		3.0	99.6	1.027
	1.7	99.0	1.007		3.7	99.	1.028
	2.0	98.2	1.002		4.0	98.6	1.027
	3.0	93.7	.966		5.0	96.2	1.013
	4.0	86.1	.897		6.0	92.2	.981
n = 80				n = 80			
	1.0	100	1.010		3.0	99.7	1.028
	2.0	99.5	1.015		3.7	99.0	1.028
	2.3	99.0	1.013		4.0	98.5	1.026
	3.0	96.7	.997		5.0	95.3	1.003
	4.0	89.9	.936		6.0	89.3	.950
n = 125				n = 125			
	1.0	100	1.010		2.0	100.	1.026
	2.0	99.6	1.016		3.0	99.9	1.030
	2.3	99.0	1.013		4.0	98.8	1.029
	3.0	96.5	.995		5.0	95.1	1.001
	4.0	87.1	.907		6.0	86.9	.924

TABLE I (Continued)

	AQL 6.5%				AQL 10.0%		
	p	P_a	C(p)		p	P_a	C(p)
n = 50				n = 50			
	5.0	99.7	1.049		8.0	99.8	1.085
	6.0	99.1	1.054		9.0	99.6	1.095
	7.0	98.6	1.052		10.0	99.1	1.101
	8.0	97.8	1.039		11.0	98.2	1.103
	9.0	95.6	1.014		12.0	96.8	1.100
n = 80				n = 80			
	4.0	100	1.041		8.0	99.8	1.085
	5.0	99.8	1.051		9.0	99.5	1.093
	6.0	99.2	1.055		10.0	98.8	1.099
	7.0	97.7	1.051		11.0	97.3	1.093
	8.0	94.6	1.028		12.0	94.8	1.073
n = 125				n = 125			
	4.0	100	1.041		8.0	100	1.087
	5.0	99.8	1.051		9.0	99.8	1.097
	6.0	99.2	1.055		10.0	99.4	1.104
	7.0	97.2	1.045		11.0	98.2	1.104
	8.0	92.5	1.005		12.0	95.8	1.088

TABLE II

Relationship Between Expected Price Per Satisfactory Item, C(p) and Incoming Percent Defective p, Using Military Standard 105D and Shifting Types of Inspection

	AQL 1.0%				AQL 1.5%		
	p	P_a	C(p)		p	P_a	C(p)
n = 50				n = 50			
	.25	99.7	.999		.375	100.	1.004
	.50	98.2	.987		.750	99.9	1.007
	.75	95.3	.960		1.125	99.0	1.001
	1.0	90.5	.914		1.5	96.5	.980
	1.25	84.3	.854		1.875	92.0	.934
n = 80				n = 80			
	.25	100.	1.003		.375	100.	1.004
	.50	99.8	1.003		.75	99.9	1.007
	.75	99.0	.997		1.125	99.1	1.002
	1.0	96.1	.971		1.5	96.9	.984
	1.25	90.6	.917		1.875	92.6	.944
n = 125				n = 125			
	.25	100.	1.003		.375	100.	1.004
	.50	99.9	1.004		.75	100.	1.007
	.75	99.0	1.007		1.125	99.8	1.009
	1.0	96.3	.973		1.5	98.9	1.004
	1.25	91.4	.926		1.875	96.4	.982

TABLE II (Continued)

	AQL 2.5%			AQL 4.0%		
	p	P_a	$C(p)$	p	P_a	$C(p)$
	n = 50			n = 32		
	.625	100.	1.006	2.0	99.9	1.019
	1.25	99.9	1.012	3.0	99.	1.021
	1.875	99.	1.009	4.0	96.2	1.002
	2.5	96.3	.985	5.0	91.8	.956
	3.125	91.4	.943	6.0	82.9	.882
	n = 80			n = 50		
	.625	100.	1.006	2.0	100.	1.020
	1.25	100.	1.013	3.0	99.8	1.029
	1.875	99.8	1.017	4.0	98.5	1.026
	2.5	98.5	1.010	5.0	95.0	1.000
	3.125	95.0	.981	6.0	87.7	.933
	n = 125			n = 80		
	.625	100.	1.006	2.0	100.	1.020
	1.25	100.	1.013	3.0	99.8	1.029
	1.875	99.9	1.018	4.0	98.5	1.026
	2.5	98.6	1.011	5.0	94.0	.989
	3.125	92.7	.957	6.0	83.5	.888

TABLE II (Continued)

AQL 6.5%				AQL 10.0%			
	p	P_a	C(p)		p	P_a	C(p)
n = 20				n = 13			
	3.25	99.9	1.033		5.0	99.9	1.052
	4.875	98.9	1.040		7.5	98.2	1.068
	6.5	95.9	1.026		10.0	95.7	1.063
	8.125	91.3	.983		12.5	90.1	1.030
	9.75	82.1	.910		15.0	82.0	.965
n = 32				n = 20			
	3.25	100.	1.034		5.0	100.	1.052
	4.875	99.7	1.048		7.5	99.8	1.079
	6.5	98.1	1.049		10.0	98.5	1.094
	8.125	93.9	1.022		12.5	95.0	1.086
	9.75	85.8	.944		15.0	87.7	1.032
n = 50				n = 32			
	3.25	100.	1.034		5.0	100.	1.052
	4.875	99.8	1.049		7.5	99.8	1.079
	6.5	98.4	1.052		10.0	98.4	1.093
	8.125	93.4	1.017		12.5	94.0	1.074
	9.75	82.2	.911		15.0	83.5	.982

III. PRICE ADJUSTED SINGLE SAMPLING

One of the purposes of an acceptance sampling program is to motivate the supplier to provide lots possessing at least an acceptable level of quality. This can be done by rejecting lots of apparent poor quality, which increase the supplier's costs, or, as done in Price Adjusted Single Sampling (PASS), by adjusting contract price, which reduces the supplier's receipts.

The underlying concept of price adjusted sampling plans is "economic indifference." In developing his idea of acceptance sampling plans with price differentials [9], Robert Roeloffs recognized this when he stated that "the consumer may be willing to pay a higher price for a product with a lower proportion defective." Roeloffs did not, however, pursue this idea explicitely. Foster and Perry introduced their sampling system using a linear indifference function, subsequently expanding PASS to include a quadratic indifference function, dependent on quality level p. The function is defined as

$$h(p) = NC(A_o + A_1 p + A_2 p^2). \tag{2}$$

The constants N and C are defined, respectively, as the lot size and the average price per acceptable unit the consumer is willing to pay. Restrictions on the coefficients A_o, A_1, and A_2 will be discussed in Chapter IV.

A. STATISTICAL DEVELOPMENT OF PASS

Let us consider a sample of size n drawn from a lot of N items. The number of defective items in a sample is denoted by x. Since the sample is taken without replacement, the random variable X which represents the number of defective items found is hypergeometrically distributed. It is assumed that N is much larger than n so the binomial approximation to the hypergeometric can be used.

To develop a PASS plan, it is necessary to identify a relationship between the total lot price P_t and x, the number of defective items in the sample. Let

$$P_t = N(C - g(x)) , \tag{3}$$

where g(x) is a function of the number of defective items. In order that P_t decreases as x increases, g(x) must be monotone increasing. In Equation (3), P_t represents the actual amount paid for a lot, while in Equation (1), h(p) represents what the consumer is willing to pay for a lot if the quality level p is known. Since the consumer wants to pay in the long run an average amount equal to what he is willing to pay, the expected value of the total lot price is equated to h(p),

$$E[P_t] = E\ [N(C - g(x))] = h(p). \tag{4}$$

Substituting Equation (2),

$$E\ [N(C - g(x))] = N\ C\ (A_0 + A_1\ p + A_2 p^2),$$

and $$NC - NE[g(x)] = NC(A_0 + A_1\ p + A_2 p^2),$$

and thus:

$$E[g(x)] = C\ (1 - A_0 + A_1\ p + A_2 p^2). \quad (5)$$

In order to use all the information contained in the coefficients of the indifference functions, let

$$g(x) = B_0 + B_1\ x + B_2\ x^2. \quad (6)$$

Then $E[g(x)] = B_0 + B_1\ E(x) + B_2\ E\ (x^2).$

Since it has been assumed that the binomial approximation applies,

$$E[g(x)] = B_0 + B_1 np + B_2[np(1-p) + (np)^2]. \quad (7)$$

Equating Equations (5) and (7) and combining terms, we have:

$$C(1-A_0) - CA_1 p - CA_2 p^2 = B_0 + (B_1 + B_2)\ np + B_2 n\ (n-1)p^2.$$

Equating coefficients of p yields:

$$B_0 = C(1 - A_0),$$

$$B_1 = \frac{CA_2 - CA_1(n-1)}{n(n-1)},$$

$$B_2 = \frac{CA_2}{n(1-n)}.$$

Substituting Equation (6) into Equation (3) and using the above relationships, P_t becomes:

$$P_t = NC\ [1 - (1-A_0 + \frac{A_2 x}{n(n-1)} - \frac{A_1(n-1)x}{n(n-1)} + \frac{A_2 x^2}{n(1-n)})],$$

$$\text{or}\quad P_t = NC\ (A_0 + \frac{A_1 x}{n} - \frac{A_2 x}{n(n-1)} + \frac{A_2 x^2}{n(n-1)}) = NCQ(x) \tag{8}$$

This is the final formula for computing payments.

In order to completely specify the plan, sample size, n, must be known. To find n it is necessary to define a PASS relationship involving producer's or consumer's risk.

B. PRODUCER'S AND CONSUMER'S RISK

Foster and Perry define the relationship involving producer's risk as follows: If the fraction defective is some predetermined quality level p, then the probability that the price paid per nondefective item is less than or equal to a specified lower bound, L, should be less than or equal to a predetermined probability, α. That is,

$$\Pr\left\{ \text{Price per nondefective item} \leq L \mid p = p_1 \right\} \leq \alpha. \tag{9}$$

The predetermined probability of being paid less than a specified lower bound α is the producer's risk. This definition can be contrasted to that given by Acheson Duncan [2], who defines "producer's risk is the probability of rejection....It is usually used in reference to rejection of lots from a process the average quality of which equals the AQL."

The relationship involving consumer's risk, β, for some specified upper bound, U, can be written:

$$\Pr\left\{\text{Price per nondefective item} \geq U \mid p = p_2\right\} \leq \beta . \quad (10)$$

Consumer's risk is the probability that the consumer will pay more than a specified upper bound, U, if the lot quality is a specified fraction defective. Historically, consumer's risk has been defined as "the probability of accepting a lot the quality of which is equal to (a specified) fraction defective." [2]

In lieu of discussing producer or consumer risk, it is also possible to refer to producer or consumer protection. If producer's risk is the probability α that the price received will be less than some lower bound, L, then producer protection, $1-\alpha$, is the probability that the price will be greater than or equal to L. Consumer protection is similarly defined.

Equations (9) and (10) can be rewritten as follows:

$$\Pr\left\{NCQ(x) \leq NL\,(1-p_1)\right\} \leq \alpha ,$$

or
$$\Pr\left\{Q(x) - \frac{L}{C}(1-p_1) \leq 0\right\} \leq \alpha , \quad (11)$$

and
$$\Pr\left\{Q(x) - \frac{U}{C}(1-p_2) \geq 0\right\} \leq \beta , \quad (12)$$

where
$$Q(x) = A + \frac{A_1 x}{n} - \frac{A_2 x}{n(n-1)} + \frac{A_2 x^2}{n(n-1)} .$$

The problem now is to find the minimum value of n which will result in either Equation (11) or (12) being satisfied, depending upon whether producer or consumer

protection is desired. Consider the case where h(p) is concave, i.e., A_2 is negative. The procedure is one of successive approximation. Referring to Equation (11), if we fix n, we could find an x such that:

$$A + \frac{A_1 x}{n} - \frac{A_2 x}{n(n-1)} + \frac{A_2 x^2}{n(n-1)} - \frac{L}{C}(1-p_1) = 0. \quad (13)$$

Let x_1 and x_2 be the roots of this equation: $x_1 \leq x_2$.

Here, $Pr\ (Q(x) - \frac{L}{C}(1-p_1) \leq 0) \leq \alpha$ is equivalent to

$$Pr\ (X \leq x_1) + Pr\ (X \geq x_2) \leq \alpha. \quad (14)$$

Similarly, referring to Equation (12) and assuming A_2 to be negative.

$$Pr\ (Q(x) - \frac{U}{C}(1-p_2) \geq 0) = Pr\ (x_1 \leq X \leq x_2) \leq \beta. \quad (15)$$

To find the minimum sample size, the solution procedure is to assume an n, then solve for x_1 and x_2. Knowing n, x_1, and x_2, one may calculate the probability that the random variable X is in the region specified by Equation (14) or (15), whichever is applicable. We continue incrementing n until the probability of occurrence is less than or equal to the desired value.

Similar results can be obtained if L(p) is convex. However, since the convex case does not allow the cost per satisfactory item to be maximized at a quality level other than zero, it is not considered further.

After the required sample size for PASS is established, and given that the indifference function is known, solving for the coefficients of the formula for computing payments, Equation (8), follows routinely. However, as Foster and Perry have pointed out, identifying the indifference function requires considerable effort, and finding the sample size requires a time consuming trial and error process. PASS could be much more useful if it could be converted into a set of tables in a format similar to Military Standard 105D.

IV. A MODEL FOR A PASS SCHEME

As stated previously, the process of developing an indifference function h(p) can be time consuming. This chapter will propose several ideas which, when combined, simplify the selection of PASS coefficients A_0, A_1, and A_2. Prior to doing this, however, a set of restrictions on these coefficients will be identified.

A. RESTRICTIONS ON THE INDIFFERENCE FUNCTION COEFFICIENTS

In Chapter III we considered h(p) to be a concave function, thus establishing the first restriction that A_2 be less than or equal to 0.

Recalling that $h(p) = NC(A_0 + A_1 p + A_2 p^2)$ represents what the customer is willing to pay for a lot having known quality p, it is unlikely that he would be willing to pay more than NC if the percent defective were zero. It is also unlikely that the supplier would accept less than NC if p = 0. Therefore, the second restriction is that $A_0 = 1.0$.

Another restriction on the coefficients can be traced to the function $g(x) = \beta_0 + \beta_1 x + \beta_2 x^2$, which in terms of the A_i's is

$$g(x) = P(1-A_0 + (\frac{A_2}{n-1} - A_1)\ \frac{x}{n} + \frac{A_2}{n(1-n)}\ x^2.$$

In order for g(x) to be monotone increasing, as required in Chapter III, A_1 must be less than or equal to 0.

Two other restrictions appear to be implicit in the indifference function itself. The value of h(p) should be less than or equal to 0 when p equals 1.0. Therefore, $A_1 + A_2$ must be less than or equal to -1.0. If we require that h(p) cannot be less than 0 if $p \leq 0.5$, then $A_2 + 2\ A_1 \geq -4$. Table III summarizes these restrictions.

TABLE III

Restrictions on Indifference Curve Coefficients

1.)	$A_2 \leq 0$	necessary
2.)	$A_0 = 1$	not mandatory
3.)	$A_1 \leq 0$	necessary
4.)	$A_1 + A_2 \leq -1$	not mandatory
5.)	$-4 \leq A_2 + 2\ A_1$	not mandatory

It may be possible, on an individual case basis, to develop an indifference function having coefficients which violate these restrictions. Convex functions are an example. In this thesis, however, our subsequent work will deal only with functions which comply with the conditions shown in Table III.

B. THE PROPOSED MODEL

As stated in Chapter III, the first step in formulating a PASS plan is to identify the indifference function. When

a quadratic function is assumed, the problem then becomes one of identifying the coefficients A_0, A_1, and A_2. In the previous section it was noted that A_0 should be set equal to 1.0. Therefore, we might seek two equations in two unknowns which could be solved to determine A_1 and A_2. Recalling that C(p) is defined as the expected price paid per satisfactory item, and using the relationships developed in the PASS system, we have

$$C(p) = E\left[\frac{P_t}{N(1-p)}\right] = \frac{E\ (P_t)}{N(1-p)} = \frac{h(p)}{N(1-p)}\ ;\ p \neq 1$$

$$\text{or} \quad C(p) = \frac{C(1 + A_1 p + A_2 p^2)}{(1-p)}\ . \tag{16}$$

By taking the first derivative of Equation (16) and setting it equal to zero, a local extremum can be found. Thus

$$\frac{d(C(p))}{dp} = C\ \left(\frac{(1-p)\ (A_1 + 2A_2 p) + (1 + A_1 p + A_2 p^2)}{(1-p)^2}\right) = 0\ ,$$

which implies that $1 + A_1 + A_2\ (2p - p^2) = 0$.

Since the extremum (maximum price paid) should occur when p is equal to acceptable quality level, this equation becomes

$$1 + A_1 + A_2\ (2\ AQL - AQL^2) = 0. \tag{17}$$

Another equation which can be used is the indifference function. Let us consider the quality level $p = p_0$ to be

the level at which $h(p) = 0$, or $NC\ (1 + A_1\ p_0 + A_2\ p_0) = 0$

which gives $(1 + A_1\ p_0 + A_2\ p_0{}^2) = 0.$ (18)

Solving for A_1 in Equation (17) and inserting this into (18) yields $1 + p_0\ (A_2\ (AQL^2 - 2\ AQL) -1) + A_2\ p_0 = 0$,

or $$A_2 = \frac{p_0 - 1}{p_0\ (AQL^2 - 2\ AQL) + p_0{}^2}, \tag{19}$$

and subsequently $$A_1 = \frac{(1 - p_0)\ (2\ AQL - AQL^2)}{p_0 (AQL^2 - 2\ AQL) + p_0{}^2} -1. \tag{20}$$

It is now possible to create a table of A_1 and A_2 values for a given set of AQL's and P_0's. Such a table would permit one to determine A_1 and A_2 for specified values of the the acceptable quality level and the fraction defective at which the customer is unwilling to pay anything for the product received. For the purpose of developing a table using the proposed model, AQL's were chosen to be 0.03, 0.05, 0.08, 0.10, 0.15, 0.20, 0.25, and 0.30. Values for p_0 were taken to be 0.5, 0.6, 0.7, 0.8, 0.9, and 1.0. Using these values in Equations (19) and (2) resulted in Table IV.

These are two particularly interesting aspects of Table IV. The first is that when $p_0 = 1.0$, the values of the coefficients are not affected by changing the AQL. Thus, in order to meet the criteria for the model, the indifference function must be linear when $p_0 = 1.0$. A second observation is that the coefficients which would be in the

lower left corner of Table IV do not meet the restrictions identified in Table III. Thus, these values cannot be used and have been deleted. This leaves a set of AQL's and P_0's excluded from the proposed sampling scheme. However, this situation is not necessarily a problem, since the excluded sets are those which would not be expected to be used. For example, it is difficult to imagine a situation in which a customer would be willing to pay the maximum price per non-defective item at an AQL = .3 and at the same time specify a p_0 = 0.5 at which he is unwilling to pay anything.

Having developed a set of coefficients for the indifference function, the next stop is to consider sample size. The next chapter will discuss the sensity of sample size to PASS parameter changes in general and describe a method to find a sample size for the set of indifference functions whose coefficients are given in Table IV.

TABLE IV

Values for Indifference Function Coefficients A_1 and A_2

AQL(1)	p_0 (2)	.5	.6	.7	.8	.9	1.0
.03	A_1	- .866	- .927	- .960	-.980	- .992	-1.000
	A_2	-2.208	-1.233	- .669	-.337	- .132	0
.05	A_1	- .758	- .871	- .931	-.965	- .987	-1.000
	A_2	-2.484	-1.327	- .711	-.356	- .138	0
.08	A_1	- .557	- .771	- .880	-.941	- .977	-1.000
	A_2	-2.887	-1.493	- .784	-.387	- .149	0
.10	A_1	- .387	- .691	- .840	-.922	- .970	-1.000
	A_2	-3.226	-1.626	- .840	-.410	- .156	0
.15	A_1	(3)	- .426	- .719	-.867	- .950	-1.000
	A_2	(3)	-2.067	-1.014	-.478	- .179	0
.20	A_1	(3)	0	- .546	-.795	- .926	-1.000
	A_2	(3)	-2.778	-1.261	-.568	- .206	0
.25	A_1	(3)	(3)	- .286	-.698	- .895	-1.000
	A_2	(3)	(3)	-1.633	-.690	- .240	0
.30	A_1	(3)	(3)	(3)	-.560	- .855	-1.000
	A_2	(3)	(3)	(3)	-.862	- .285	0

(1) AQL = Acceptable Quality Level
(2) p_0 = Fraction defective at which the consumer is unwilling to pay anything.
(3) Values calculated do not satisfy the restrictions given in Table III.

V. VARIOUS CHARACTERISTICS OF THE PROPOSED SAMPLING SCHEME

In this chapter we will examine the general PASS system for sensitivity to changes in its parameters and also investigate the proposed scheme in this regard. Then we will look at the proposed scheme to see if it lends itself to a tabular format similar to that of Military Standard 105D.

A. SENSITIVITY OF THE GENERAL PASS MODEL

In examining the sensitivity of the PASS model, the question which needs to be answered is "How does the selection of parameters, such as A_0, A_1, A_2, and p, affect the required sample size, n. The critical relationship to determine the sensitivity of sample size to these parameters is Equation (13),

$$A_0 + \frac{A_1 x}{n} - \frac{A_2 x}{n(n-1)} + \frac{A_2 x^2}{n(n-1)} - \frac{L}{C}(1-p_1) = 0.$$

If A_0, A_1, and A_2 comply with the restrictions given in Chapter IV, then there is only one root of Equation (13) which is of interest. The smaller root, x_1, is negative and of no relevance in Equation (14). So we have

$$x_2 = \left[\frac{A_2}{n(n-1)} - \frac{A_1}{n} - \sqrt{\left(\frac{A_1}{n} - \frac{A_2}{n(n-1)}\right)^2 - 4\left(A_0 - \frac{L}{C}(1-p_1)\right)\frac{A_2}{n(n-1)}}\right] \Big/ \frac{2A_2}{n(n-1)}. \quad (21)$$

As explained in Chapter III, the procedure for finding the minimum sample size is as follows. Fix n and calculate

the value of x_2. Then Pr $(X \geq x_2)$ is evaluated, using the cumulative binomial distribution, and compared to α. If Pr $(X \geq x_2) > \alpha$, then the sample size is increased which results in a larger x_2. This is continued until an n is found such that $\Pr(X \geq x_2) \leq \alpha$. For a given sample size, n, it is important to see how changes in A_1, A_2, and Z affect x_2, where Z is defined as $Z = \frac{L}{C}(1-p_1)$. Taking the partial differentials of Equation (21) results in the following equations:

$$\frac{\partial x_2}{\partial A_1} = \frac{1-n}{2A_2}\left(1 + \left[\left(\frac{A_1}{n} - \frac{A_2}{n(n-1)}\right)^2 - 4(1-Z)\frac{A_2}{n(n-1)}\right]^{-\frac{1}{2}}\left(\frac{A_1}{n} - \frac{A_2}{n(n-1)}\right)\right),$$

$$\frac{\partial x_2}{\partial A_2} = \frac{A_1(n-1)}{2A_2^{2}} - \left[\frac{A_2}{n(n-1)}\left[\left(\frac{A_1}{n} - \frac{A_2}{n(n-1)}\right)^2 - 4(1-Z)\frac{A_2}{n(n-1)}\right]^{-\frac{1}{2}}\right.$$

$$\left(\frac{-2}{n(n-1)}\left(\frac{A_1}{n} - \frac{A_2}{n(n-1)}\right)\left(\frac{-4(1-Z)}{n(n-1)}\right)\right) - \left[\left(\frac{A_1}{n} - \frac{A_2}{n(n-1)}\right)^2 - 4(1-Z)\frac{A_2}{n(n-1)}\right]^{\frac{1}{2}}$$

$$\left.\left(\frac{2}{n(n-1)}\right)\right] \Bigg/ \left(\frac{2A_2}{n(n-1)}\right)^2,$$

and $$\frac{\partial x_2}{\partial Z} = \frac{n(1-n)}{A_2}\left[\left(\frac{A_1}{n} - \frac{A_2}{n(n-1)}\right)^2 - 4(1-Z)\frac{A_2}{n(n-1)}\right]^{-\frac{1}{2}}\frac{A_2}{n(n-1)}.$$

Although these expressions are very unwieldy, they indicate the following: x_2 increases as A_1 or A_2 increases. As Z decreases, x_2 increases, which implies that x_2 increases as the ratio $\frac{L}{C}$ decreases or as p_1 increases. It should be noted that in Table IV as the values of A_1 decrease across a row, the corresponding values of A_2 increase. This behavior makes the finding that the value of x_2 is directly related

to A_1 and A_2 particularly important, since it may be found that for a given p_0, the minimum sample size may depend only on the $\frac{L}{C}$ ratio and not on AQL.

B. EXAMINING THE PROPOSED MODEL

In order to examine the sensitivity of the proposed scheme, a computer program was written to determine the values of x_2 for each set of the indifference function coefficients given in Table IV as $\frac{L}{C}$ varied from .9 to 1.0 and as n varied from 10 to 150. The output of that program is contained in Appendix A. After setting producer's risk at .05, it was possible to consult a table of cumulative binomial probabilities to determine the minimum value of x_2 for a given n which would result in a probability of occurrence less than or equal to .05. Table V contains these values of x_2. Having this table, the minimum value of n, given AQL, p_0, and $\frac{L}{C}$, was found. This was done by searching each column of the computer output until an x_2, rounded up, was found which was equal to the appropriate entry in Table V. These minimum values of n are noted in Table VI. By having these values in a table, it is possible to evaluate if any further consolidation is possible.

As can be seen for small values of AQL and small values of $\frac{L}{C}$, the values of n behave very well in that they change very little for different values of p_0. However, as either AQL or $\frac{L}{C}$ approaches the upper limits under consideration, the values of n vary widely over the range of p_0.

TABLE V

Minimum Number of Defects in a Sample of Size n, Given an Acceptable Quality Level, to Meet an α of 0.05

n \ AQL	.03	.05	.08	.10	.15	.20	.25	.30
10	2	3	3	4	4	5	6	6
20	3	4	5	5	7	8	9	10
30	4	5	6	7	9	11	12	14
40	4	5	7	8	11	13	16	18
50	5	6	8	10	13	16	19	21
60	5	7	9	11	15	18	22	25
70	6	8	11	12	17	21	25	28
80	6	8	12	14	18	23	27	32
90	7	9	13	15	20	25	30	35
100	7	10	14	16	22	28	33	39
110	7	10	15	17	24	30	36	42
120	8	11	16	19	26	32	39	45
130	8	12	17	20	27	35	42	49
140	9	12	18	21	29	37	45	52
150	9	13	19	22	31	39	47	55

TABLE VI

Minimum Sample Size for a Given AQL, p_0, and $\frac{L}{C}$ Ratio at $\alpha = .05$

AQL	p_0	$\frac{L}{C}$: .90	.91	.92	.93	.94	.95	.96	.97
.03	.5	10	10	10	10	40	40	80	110
	.6	10	10	10	40	40	40	80	110
	.7	10	10	10	40	40	40	80	110
	.8	10	10	10	40	40	40	80	110
	.9	10	10	10	40	40	40	80	110
.05	.5	30	40	40	40	40	40	80	110
	.6	30	40	40	40	40	80	80	140
	.7	30	40	40	40	40	80	80	140
	.8	30	40	40	40	40	80	80	140
	.9	30	40	40	40	40	80	80	>150
.08	.5	30	30	40	40	50	60	110	150
	.6	30	40	40	50	50	100	130	>150
	.7	30	40	40	50	60	110	150	>150
	.8	30	40	40	50	60	120	150	>150
	.9	30	40	40	50	60	120	150	>150
.10	.5	20	40	40	40	60	70	70	110
	.6	40	40	40	60	70	100	110	>150
	.7	40	40	40	60	70	100	150	>150
	.8	40	40	60	70	90	110	>150	>150
	.9	40	40	60	70	100	110	>150	>150
.15	.6	40	50	50	60	80	80	80	130
	.7	50	60	70	80	80	130	130	>150
	.8	50	70	80	80	130	130	>150	>150
	.9	60	80	80	90	130	>150	>150	>150

TABLE VI (Continued)

AQL	p_0	L/C: .90	.91	.92	.93	.94	.95	.96	.97
.20	.6	40	40	40	40	40	40	60	60
	.7	40	60	60	60	80	90	110	120
	.8	60	60	80	90	120	150	>150	>150
	.9	60	80	90	120	>150	>150	>150	>150
.25	.7	30	30	50	60	70	70	80	80
	.8	70	80	80	80	100	140	150	>150
	.9	80	80	110	150	>150	>150	>150	>150
.30	.8	50	50	70	70	90	90	110	120
	.9	90	110	120	150	>150	>150	>150	>150

TABLE VII

Minimum Sample Size Given p_0 And the $\frac{L}{C}$ Ratio for AQL's From 0.03 - 0.30

$\frac{L}{C}$ \ p_0	.5	.6	.7	.8	.9
.90	20	30	30	50	50
.91	30	30	30	50	50
.92	30	30	40	60	80
.93	30	50	50	70	110
.94	50	50	70	70	110
.95	60	80	80	90	150
.96	80	90	100	140	(1)
.97	110	140	150	(1)	(1)

(1) Minimum sample size exceeds 150.

If AQL's of .10 or less are assumed to be the area of interest, it is apparent that a simple table using AQL and $\frac{L}{C}$ as references could be used to determine a "good" value of n. However, when the wider range of AQL's (.03 - .30) was considered, it appeared more useful to create a table based on cross referencing p_0 and $\frac{L}{C}$. Table VII was developed using the criteria that the sample size should be minimized subject to producer's risk being kept between 0.01 and 0.10. This range can be compared to producer's risk in Military Standard 105D which varies from .01 to .11. This objective was achieved with the exception of the starred entries in Table VII where sample sizes larger than 150 would have been required.

Using Table VII in conjunction with Table IV, it is possible to find a sampling plan for any of the identified AQL and p_0 values. Having found the desired plan, the last item of interest would be to see what kind of operating characteristic curves the plan would have.

C. OPERATING CHARACTERISTIC CURVES

It is of interest to show how payments will vary over the range of p rather than at just two points, the AQL and p_0. To satisfy this need, operating characteristic curves may be developed. Having established a plan, we know sample size and the indifference function, h(p). It is now

possible to calculate the expected price per satisfactory item, C(p),

$$C(p) = \frac{E[P_t]}{N(1-p)} = \frac{C(1 + A_1 p + A_2 p^2)}{(1-p)} .$$

In addition to a plot of C(p), a complete set of operating characteristic curves would include a plot of two other functions, the "lower," L(p), and "upper," U(p), price per satisfactory item. They correspond, respectively, to a chosen α and β. Here, L(p) and U(p) are defined as

$$L(p) = \frac{C \quad Q(k_1)}{1-p} ,$$

$$\text{and } U(p) = \frac{C \quad Q(k_2)}{1-p} ,$$

where k_1 and k_2 are values of x which, for a given p, satisfy the limits set for producer's or consumer's risk. This concept is best clarified by an example.

D. AN EXAMPLE

Suppose that a government agency is contracting out for bus service and that it has been decided that an acceptable quality level would be that buses could be off schedule ten percent of the time, i.e., AQL = .10. It has also been decided that if buses aren't on time eighty percent of the time, then the contractor should be paid nothing, i.e., $p_0 = 0.8$. In order to attract bids, it is decided that the lower limit should be set at ninety-five percent of the

average price paid for a good item, i.e., $\frac{L}{C} = 0.95$. Using this information, we find from Table IV that $A_1 = -.922$ and $A_2 = 0.410$ and, from Table VII, $n = 90$. From this we have

$$C(p) = C(1 - .922\,p - .41\,p^2) \;/\; (1-p)\ ,$$

$$L(p) = C\ \left(1 - \frac{.922}{90}\,k_1 + \frac{.41}{90(89)}\,k_1 - \frac{.41}{90(89)}\,k_1^{\,2}\right) \;/\; (1-p)\ ,$$

and $$U(p) = C\ \left(1 - \frac{.922}{90}\,k_2 + \frac{.41}{90(89)}\,k_2 - \frac{.41}{90(89)}\,k_2^{\,2}\right) \;/\; (1-p).$$

These equations are solved for various values of p and the resultant functional values are given in Table VIII. To find any k value, a cumulative binomial probability table can be used and an x can be found which satisfies the risk requirements. If $p = 0.03$, $n = 90$, and $\alpha = 0.05$, then $k_1 = 7$; if $\alpha = 0.005$, then k_1 would $= 9$. As can be seen from Table VIII, the possibility of wide variation from C(p) increases dramatically as p increases. Another feature, which the table points out, is that negative payments are possible. This is not surprising, since the customer in identifying p_0 has established the point beyond which the supplier's poor performance actually results in damages to the customer beyond the value of whatever good items have been received in the lot.

TABLE VIII

Operating Characteristic Curve Values

p	k_1 (1)	k_2 (2)	L(p)	C(p)	U(p)
.03	7	1	.955	1.002	1.020
.05	9	2	.952	1.003	1.031
.08	13	4	.934	1.004	1.042
.10	15	5	.928	1.004	1.057
.15	20	9	.913	1.003	1.064
.20	25	13	.891	.999	1.074
.25	30	17	.864	.992	1.083
.30	35	21	.829	.981	1.091
.40	45	30	.729	.943	1.080
.50	54	39	.601	.873	1.049
.60	63	41	.387	.748	.982
.70	71	57	.061	.512	.842
.80	79	67	- .624	.000	.436
.90	86	77	-2.552	-1.619	- .883

(1) k_1 figured at $\alpha = .05$.

(2) k_2 figured at $\beta = .10$.

VI. CONCLUSIONS AND RECOMMENDATIONS

In summary, the basic quantities needed to complete a PASS plan, with quadratic indifference, are n, the sample size, and h(p), the indifference function. By using the idea suggested by Military Standard 105D of maximizing the price paid per nondefective item at the AQL, by noting the restrictions on the coefficients of the indifference function, and by defining h(p) to be 0 at p_0, it was possible to develop the proposed system which determined a set of indifference functions based on the values of AQL and p_0. Then a simplified method of finding sample size was presented which kept producer's risk between one and ten percent. Finally, the method for determining the proposed system's Operating Characteristics Curves was illustrated.

In order to implement the proposed system, only AQL, p_0, and the $\frac{L}{C}$ ratio need to be known. With this information n and P_t, the payment function, can be found. After inspecting n items from a lot of size N, the number of defective items, x, will be known and the value P_t can be paid to the supplier.

The primary purpose of applying PASS, and also the proposed system, is to eliminate the necessity of rejecting lots. This is of particular advantage when the customer would rather not reject the lot, in the case of a badly needed

part, or cannot reject the lot, in the case of having services performed. The added advantage of the proposed system is that it eliminates the problem of identifying the indifference function and it shortens the time required to find n.

A. RECOMMENDATIONS FOR FURTHER STUDY

The following are recommended areas for further study:

1. It may be possible to develop a set of switching rules for the proposed system, similar to those in Military Standard 105D.
2. An area consciously omitted from this study was the problem of how to determine NC, the total price paid if $p = 0$.
3. In all probability the actual operating region for a supplier should be in the vicinity of the AQL. It may be possible to use a linear approximation to the indifference function in that region.
4. It may be enlightening to determine what effect increasing sample size (for a given indifference function) would have on the spread between $U(p)$ and $L(p)$.
5. Betty Flehinger and James Miller [3] have done a paper on price paid being dependent on sampling; however, the detailed analysis is considered for repairable systems. The scheme proposed in this paper is more oriented toward non-repairable systems.

An analysis along the lines of ref. 3 for non-repairable systems, keeping PASS in mind could be interesting.

It is hoped that this work will not only be useful to those faced with the problem of being required to accept lots and needing a means to adjust price, but will also generate interest in further studies in this area.

APPENDIX A

Solutions to Equation (21)

AQL=0.03 PO=0.50

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	1.3	1.3	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.5	0.4
20	2.4	2.3	2.1	2.0	1.8	1.7	1.5	1.3	1.1	0.9	0.7
30	3.6	3.4	3.1	2.9	2.7	2.4	2.2	1.9	1.6	1.3	1.0
40	4.7	4.4	4.1	3.8	3.5	3.2	2.8	2.5	2.1	1.7	1.4
50	5.8	5.5	5.1	4.7	4.3	3.9	3.5	3.1	2.6	2.2	1.7
60	7.0	6.5	6.1	5.6	5.2	4.7	4.2	3.7	3.1	2.6	2.0
70	8.1	7.6	7.1	6.5	6.0	5.4	4.9	4.3	3.6	3.0	2.3
80	9.2	8.6	8.1	7.5	6.8	6.2	5.5	4.8	4.1	3.4	2.6
90	10.4	9.7	9.0	8.4	7.7	6.9	6.2	5.4	4.6	3.8	2.9
100	11.5	10.8	10.0	9.3	8.5	7.7	6.9	6.0	5.1	4.2	3.3
110	12.6	11.8	11.0	10.2	9.3	8.5	7.6	6.6	5.6	4.6	3.6
120	13.7	12.9	12.0	11.1	10.2	9.2	8.2	7.2	6.1	5.1	3.9
130	14.9	13.9	13.0	12.0	11.0	10.0	8.9	7.8	6.7	5.5	4.2
140	16.0	15.0	14.0	12.9	11.8	10.7	9.6	8.4	7.2	5.9	4.5
150	17.1	16.1	15.0	13.8	12.7	11.5	10.3	9.0	7.7	6.3	4.9

AQL=0.03 PO=0.60

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	1.3	1.2	1.1	1.0	1.0	0.9	0.8	0.7	0.6	0.5	0.4
20	2.5	2.3	2.1	2.0	1.8	1.6	1.4	1.3	1.1	0.9	0.7
30	3.7	3.4	3.2	2.9	2.7	2.4	2.1	1.8	1.6	1.3	1.0
40	4.8	4.5	4.2	3.9	3.5	3.2	2.8	2.4	2.1	1.7	1.3
50	6.0	5.6	5.2	4.8	4.4	3.9	3.5	3.0	2.6	2.1	1.6
60	7.2	6.7	6.2	5.7	5.2	4.7	4.2	3.6	3.1	2.5	1.9
70	8.4	7.8	7.3	6.7	6.1	5.5	4.8	4.2	3.6	2.9	2.2
80	9.6	8.9	8.3	7.6	6.9	6.2	5.5	4.8	4.1	3.3	2.5
90	10.8	10.0	9.3	8.5	7.8	7.0	6.2	5.4	4.6	3.7	2.8
100	11.9	11.1	10.3	9.5	8.6	7.8	6.9	6.0	5.1	4.1	3.1
110	13.1	12.2	11.3	10.4	9.5	8.5	7.6	6.6	5.6	4.5	3.5
120	14.3	13.3	12.4	11.4	10.3	9.3	8.2	7.2	6.1	4.9	3.8
130	15.5	14.4	13.4	12.3	11.2	10.1	8.9	7.7	6.6	5.3	4.1
140	16.7	15.6	14.4	13.2	12.0	10.8	9.6	8.3	7.1	5.7	4.4
150	17.9	16.7	15.4	14.2	12.9	11.6	10.3	8.9	7.6	6.1	4.7

AQL=0.03 P0=0.70

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	1.3	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3
20	2.5	2.3	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6
30	3.7	3.5	3.2	2.9	2.7	2.4	2.1	1.8	1.5	1.2	0.9
40	4.9	4.6	4.2	3.9	3.5	3.1	2.8	2.4	2.0	1.6	1.2
50	6.2	5.7	5.3	4.8	4.4	3.9	3.5	3.0	2.5	2.0	1.6
60	7.4	6.9	6.3	5.8	5.2	4.7	4.1	3.6	3.0	2.4	1.9
70	8.6	8.0	7.4	6.7	6.1	5.5	4.8	4.2	3.5	2.8	2.2
80	9.8	9.1	8.4	7.7	7.0	6.3	5.5	4.8	4.0	3.2	2.5
90	11.0	10.3	9.5	8.7	7.8	7.0	6.2	5.4	4.5	3.6	2.8
100	12.3	11.4	10.5	9.6	8.7	7.8	6.9	5.9	5.0	4.0	3.1
110	13.5	12.5	11.6	10.6	9.6	8.6	7.6	6.5	5.5	4.5	3.4
120	14.7	13.7	12.6	11.5	10.4	9.4	8.2	7.1	6.0	4.9	3.7
130	15.9	14.8	13.6	12.5	11.3	10.1	8.9	7.7	6.5	5.3	4.0
140	17.1	15.9	14.7	13.4	12.2	10.9	9.6	8.3	7.0	5.7	4.3
150	18.4	17.0	15.7	14.4	13.0	11.7	10.3	8.9	7.5	6.1	4.6

AQL=0.03 P0=0.80

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	1.3	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3
20	2.5	2.3	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6
30	3.8	3.5	3.2	2.9	2.6	2.4	2.1	1.8	1.5	1.2	0.9
40	5.0	4.6	4.3	3.9	3.5	3.1	2.8	2.4	2.0	1.6	1.2
50	6.2	5.8	5.3	4.9	4.4	3.9	3.5	3.0	2.5	2.0	1.5
60	7.5	6.9	6.4	5.8	5.3	4.7	4.1	3.6	3.0	2.4	1.8
70	8.7	8.1	7.4	6.8	6.1	5.5	4.8	4.2	3.5	2.8	2.1
80	10.0	9.2	8.5	7.8	7.0	6.3	5.5	4.7	4.0	3.2	2.4
90	11.2	10.4	9.6	8.7	7.9	7.0	6.2	5.3	4.5	3.6	2.7
100	12.5	11.5	10.6	9.7	8.8	7.8	6.9	5.9	5.0	4.0	3.0
110	13.7	12.7	11.7	10.7	9.6	8.6	7.6	6.5	5.5	4.4	3.3
120	14.9	13.8	12.7	11.6	10.5	9.4	8.3	7.1	6.0	4.8	3.6
130	16.2	15.0	13.8	12.6	11.4	10.2	8.9	7.7	6.5	5.2	3.9
140	17.4	16.2	14.9	13.6	12.3	10.9	9.6	8.3	7.0	5.6	4.3
150	18.7	17.3	15.9	14.5	13.1	11.7	10.3	8.9	7.5	6.0	4.6

AQL=0.03 P0=0.90

N	L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10		1.3	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3
20		2.5	2.3	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6
30		3.8	3.5	3.2	2.9	2.6	2.4	2.1	1.8	1.5	1.2	0.9
40		5.1	4.7	4.3	3.9	3.5	3.1	2.8	2.4	2.0	1.6	1.2
50		6.3	5.8	5.4	4.9	4.4	3.9	3.4	3.0	2.5	2.0	1.5
60		7.6	7.0	6.4	5.9	5.3	4.7	4.1	3.6	3.0	2.4	1.8
70		8.8	8.2	7.5	6.8	6.2	5.5	4.8	4.1	3.5	2.8	2.1
80		10.1	9.3	8.6	7.8	7.0	6.3	5.5	4.7	4.0	3.2	2.4
90		11.3	10.5	9.6	8.8	7.9	7.1	6.2	5.3	4.5	3.6	2.7
100		12.6	11.7	10.7	9.8	8.8	7.8	6.9	5.9	5.0	4.0	3.0
110		13.9	12.8	11.8	10.7	9.7	8.6	7.6	6.5	5.4	4.4	3.3
120		15.1	14.0	12.8	11.7	10.6	9.4	8.3	7.1	5.9	4.8	3.6
130		16.4	15.2	13.9	12.7	11.4	10.2	8.9	7.7	6.4	5.2	3.9
140		17.6	16.3	15.0	13.7	12.3	11.0	9.6	8.3	6.9	5.6	4.2
150		18.9	17.5	16.1	14.6	13.2	11.8	10.3	8.9	7.4	6.0	4.5

AQL=0.05 P0=0.50

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	1.6	1.5	1.4	1.4	1.3	1.2	1.1	1.0	0.9	0.8	0.7
20	2.9	2.7	2.6	2.5	2.3	2.1	2.0	1.8	1.6	1.5	1.3
30	4.2	4.0	3.8	3.6	3.3	3.1	2.9	2.6	2.4	2.1	1.8
40	5.5	5.3	5.0	4.7	4.4	4.1	3.8	3.4	3.1	2.7	2.4
50	6.9	6.5	6.2	5.8	5.4	5.1	4.7	4.3	3.8	3.4	2.9
60	8.2	7.8	7.4	6.9	6.5	6.0	5.6	5.1	4.6	4.0	3.5
70	9.5	9.1	8.6	8.1	7.5	7.0	6.5	5.9	5.3	4.7	4.0
80	10.9	10.3	9.8	9.2	8.6	8.0	7.4	6.7	6.0	5.3	4.6
90	12.2	11.6	10.9	10.3	9.6	9.0	8.2	7.5	6.8	6.0	5.1
100	13.5	12.8	12.1	11.4	10.7	9.9	9.1	8.3	7.5	6.6	5.7
110	14.9	14.1	13.3	12.5	11.7	10.9	10.0	9.1	8.2	7.3	6.3
120	16.2	15.4	14.5	13.7	12.8	11.9	10.9	10.0	9.0	7.9	6.8
130	17.5	16.6	15.7	14.8	13.8	12.9	11.8	10.8	9.7	8.6	7.4
140	18.8	17.9	16.9	15.9	14.9	13.8	12.7	11.6	10.4	9.2	7.9
150	20.2	19.2	18.1	17.0	15.9	14.8	13.6	12.4	11.2	9.9	8.5

AQL=0.05 P0=0.60

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	1.5	1.4	1.4	1.3	1.2	1.1	1.0	0.9	0.8	0.7	0.6
20	2.9	2.7	2.6	2.4	2.2	2.1	1.9	1.7	1.5	1.3	1.1
30	4.3	4.0	3.8	3.5	3.3	3.0	2.8	2.5	2.2	2.0	1.7
40	5.6	5.3	5.0	4.7	4.3	4.0	3.7	3.3	2.9	2.6	2.2
50	7.0	6.6	6.2	5.8	5.4	5.0	4.5	4.1	3.7	3.2	2.7
60	8.4	7.9	7.4	7.0	6.5	6.0	5.4	4.9	4.4	3.8	3.3
70	9.8	9.2	8.7	8.1	7.5	6.9	6.3	5.7	5.1	4.4	3.8
80	11.1	10.5	9.9	9.2	8.6	7.9	7.2	6.5	5.8	5.1	4.3
90	12.5	11.8	11.1	10.4	9.6	8.9	8.1	7.3	6.5	5.7	4.8
100	13.9	13.1	12.3	11.5	10.7	9.9	9.0	8.1	7.2	6.3	5.4
110	15.3	14.4	13.5	12.7	11.7	10.8	9.9	8.9	7.9	6.9	5.9
120	16.6	15.7	14.8	13.8	12.8	11.8	10.8	9.7	8.7	7.6	6.4
130	18.0	17.0	16.0	14.9	13.9	12.8	11.7	10.5	9.4	8.2	7.0
140	19.4	18.3	17.2	16.1	14.9	13.8	12.6	11.3	10.1	8.8	7.5
150	20.8	19.6	18.4	17.2	16.0	14.7	13.4	12.1	10.8	9.4	8.0

AQL=0.05 P0=0.70

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	1.5	1.4	1.3	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.6
20	2.9	2.7	2.5	2.4	2.2	2.0	1.8	1.6	1.5	1.3	1.1
30	4.3	4.0	3.8	3.5	3.3	3.0	2.7	2.4	2.2	1.9	1.6
40	5.7	5.4	5.0	4.7	4.3	4.0	3.6	3.2	2.9	2.5	2.1
50	7.1	6.7	6.3	5.8	5.4	4.9	4.5	4.0	3.6	3.1	2.6
60	8.5	8.0	7.5	7.0	6.4	5.9	5.4	4.8	4.3	3.7	3.1
70	9.9	9.3	8.7	8.1	7.5	6.9	6.3	5.6	5.0	4.3	3.7
80	11.3	10.6	10.0	9.3	8.6	7.9	7.1	6.4	5.7	4.9	4.2
90	12.7	12.0	11.2	10.4	9.6	8.8	8.0	7.2	6.4	5.5	4.7
100	14.1	13.3	12.4	11.6	10.7	9.8	8.9	8.0	7.1	6.1	5.2
110	15.5	14.6	13.7	12.7	11.8	10.8	9.8	8.8	7.8	6.8	5.7
120	17.0	15.9	14.9	13.9	12.8	11.8	10.7	9.6	8.5	7.4	6.2
130	18.4	17.3	16.1	15.0	13.9	12.7	11.6	10.4	9.2	8.0	6.8
140	19.8	18.6	17.4	16.2	14.9	13.7	12.4	11.2	9.9	8.6	7.3
150	21.2	19.9	18.6	17.3	16.0	14.7	13.3	12.0	10.6	9.2	7.8

AQL=0.05 P0=0.80

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	1.5	1.4	1.3	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.5
20	2.9	2.7	2.5	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0
30	4.3	4.1	3.8	3.5	3.2	3.0	2.7	2.4	2.1	1.8	1.5
40	5.8	5.4	5.0	4.7	4.3	3.9	3.6	3.2	2.8	2.4	2.1
50	7.2	6.7	6.3	5.8	5.4	4.9	4.4	4.0	3.5	3.0	2.6
60	8.6	8.1	7.5	7.0	6.4	5.9	5.3	4.8	4.2	3.6	3.1
70	10.0	9.4	8.8	8.1	7.5	6.9	6.2	5.6	4.9	4.2	3.6
80	11.5	10.7	10.0	9.3	8.6	7.8	7.1	6.3	5.6	4.8	4.1
90	12.9	12.1	11.3	10.5	9.6	8.8	8.0	7.1	6.3	5.4	4.6
100	14.3	13.4	12.5	11.6	10.7	9.8	8.9	7.9	7.0	6.1	5.1
110	15.7	14.8	13.8	12.8	11.8	10.8	9.7	8.7	7.7	6.7	5.6
120	17.2	16.1	15.0	13.9	12.8	11.7	10.6	9.5	8.4	7.3	6.1
130	18.6	17.4	16.3	15.1	13.9	12.7	11.5	10.3	9.1	7.9	6.6
140	20.0	18.8	17.5	16.2	15.0	13.7	12.4	11.1	9.8	8.5	7.1
150	21.5	20.1	18.8	17.4	16.0	14.7	13.3	11.9	10.5	9.1	7.6

AQL=0.05 P0=0.90

N	L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10		1.5	1.4	1.3	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.5
20		2.9	2.7	2.5	2.3	2.2	2.0	1.8	1.6	1.4	1.2	1.0
30		4.3	4.1	3.8	3.5	3.2	2.9	2.7	2.4	2.1	1.8	1.5
40		5.8	5.4	5.0	4.7	4.3	3.9	3.5	3.2	2.8	2.4	2.0
50		7.2	6.8	6.3	5.8	5.4	4.9	4.4	3.9	3.5	3.0	2.5
60		8.7	8.1	7.5	7.0	6.4	5.9	5.3	4.7	4.2	3.6	3.0
70		10.1	9.4	8.8	8.1	7.5	6.8	6.2	5.5	4.9	4.2	3.5
80		11.5	10.8	10.1	9.3	8.6	7.8	7.1	6.3	5.5	4.8	4.0
90		13.0	12.1	11.3	10.5	9.6	8.8	7.9	7.1	6.2	5.4	4.5
100		14.4	13.5	12.6	11.6	10.7	9.8	8.8	7.9	6.9	6.0	5.0
110		15.9	14.8	13.8	12.8	11.8	10.7	9.7	8.7	7.6	6.6	5.5
120		17.3	16.2	15.1	14.0	12.8	11.7	10.6	9.5	8.3	7.2	6.0
130		18.7	17.5	16.3	15.1	13.9	12.7	11.5	10.2	9.0	7.8	6.5
140		20.2	18.9	17.6	16.3	15.0	13.7	12.3	11.0	9.7	8.4	7.0
150		21.6	20.2	18.8	17.4	16.0	14.6	13.2	11.8	10.4	9.0	7.6

AQL=0.08 P0=0.50

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	2.0	1.9	1.9	1.8	1.7	1.6	1.6	1.5	1.4	1.3	1.3
20	3.6	3.5	3.4	3.2	3.1	3.0	2.8	2.7	2.5	2.3	2.2
30	5.3	5.1	4.9	4.7	4.5	4.3	4.1	3.8	3.6	3.4	3.1
40	6.9	6.7	6.4	6.2	5.9	5.6	5.3	5.0	4.7	4.4	4.1
50	8.6	8.3	7.9	7.6	7.3	6.9	6.6	6.2	5.8	5.4	5.0
60	10.2	9.9	9.5	9.1	8.7	8.3	7.9	7.4	7.0	6.5	6.0
70	11.9	11.5	11.0	10.6	10.1	9.6	9.1	8.6	8.1	7.5	6.9
80	13.5	13.1	12.6	12.0	11.5	10.9	10.4	9.8	9.2	8.6	7.9
90	15.2	14.7	14.1	13.5	12.9	12.3	11.6	11.0	10.3	9.6	8.9
100	16.9	16.3	15.6	15.0	14.3	13.6	12.9	12.2	11.4	10.6	9.8
110	18.5	17.8	17.2	16.4	15.7	15.0	14.2	13.4	12.5	11.7	10.8
120	20.2	19.4	18.7	17.9	17.1	16.3	15.4	14.6	13.7	12.7	11.7
130	21.8	21.0	20.2	19.4	18.5	17.6	16.7	15.8	14.8	13.8	12.7
140	23.5	22.6	21.8	20.9	19.9	19.0	18.0	17.0	15.9	14.8	13.7
150	25.2	24.2	23.3	22.3	21.3	20.3	19.2	18.1	17.0	15.8	14.6

AQL=0.08 P0=0.60

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	1.9	1.8	1.7	1.6	1.6	1.5	1.4	1.3	1.2	1.1	1.0
20	3.5	3.4	3.2	3.1	2.9	2.8	2.6	2.4	2.3	2.1	1.9
30	5.2	5.0	4.8	4.5	4.3	4.1	3.8	3.6	3.3	3.1	2.8
40	6.9	6.6	6.3	6.0	5.7	5.4	5.0	4.7	4.4	4.0	3.7
50	8.6	8.2	7.8	7.5	7.1	6.7	6.3	5.9	5.4	5.0	4.5
60	10.3	9.8	9.4	8.9	8.5	8.0	7.5	7.0	6.5	6.0	5.4
70	11.9	11.4	10.9	10.4	9.8	9.3	8.7	8.1	7.5	6.9	6.3
80	13.6	13.0	12.4	11.8	11.2	10.6	9.9	9.3	8.6	7.9	7.2
90	15.3	14.7	14.0	13.3	12.6	11.9	11.2	10.4	9.7	8.9	8.1
100	17.0	16.3	15.5	14.8	14.0	13.2	12.4	11.6	10.7	9.9	9.0
110	18.7	17.9	17.1	16.2	15.4	14.5	13.6	12.7	11.8	10.8	9.9
120	20.4	19.5	18.6	17.7	16.7	15.8	14.8	13.9	12.8	11.8	10.7
130	22.0	21.1	20.1	19.1	18.1	17.1	16.1	15.0	13.9	12.8	11.6
140	23.7	22.7	21.7	20.6	19.5	18.4	17.3	16.1	15.0	13.8	12.5
150	25.4	24.3	23.2	22.1	20.9	19.7	18.5	17.3	16.0	14.7	13.4

AQL=0.08 PO=0.70

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	1.8	1.7	1.6	1.6	1.5	1.4	1.3	1.2	1.1	1.0	0.9
20	3.5	3.3	3.2	3.0	2.8	2.7	2.5	2.3	2.1	1.9	1.8
30	5.2	4.9	4.7	4.5	4.2	3.9	3.7	3.4	3.1	2.9	2.6
40	6.9	6.6	6.2	5.9	5.6	5.2	4.9	4.5	4.2	3.8	3.4
50	8.6	8.2	7.8	7.4	6.9	6.5	6.1	5.6	5.2	4.7	4.3
60	10.3	9.8	9.3	8.8	8.3	7.8	7.3	6.8	6.2	5.7	5.1
70	12.0	11.4	10.8	10.3	9.7	9.1	8.5	7.9	7.2	6.6	6.0
80	13.7	13.0	12.4	11.7	11.0	10.4	9.7	9.0	8.3	7.6	6.8
90	15.4	14.6	13.9	13.2	12.4	11.6	10.9	10.1	9.3	8.5	7.7
100	17.1	16.3	15.4	14.6	13.8	12.9	12.1	11.2	10.3	9.4	8.5
110	18.8	17.9	17.0	16.1	15.1	14.2	13.3	12.3	11.3	10.4	9.4
120	20.5	19.5	18.5	17.5	16.5	15.5	14.5	13.4	12.4	11.3	10.2
130	22.2	21.1	20.1	19.0	17.9	16.8	15.7	14.5	13.4	12.2	11.1
140	23.9	22.7	21.6	20.4	19.3	18.1	16.9	15.6	14.4	13.2	11.9
150	25.6	24.4	23.1	21.9	20.6	19.4	18.1	16.8	15.4	14.1	12.7

AQL=0.08 PO=0.80

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0	1.0	0.9
20	3.5	3.3	3.1	2.9	2.8	2.6	2.4	2.2	2.0	1.9	1.7
30	5.2	4.9	4.7	4.4	4.1	3.9	3.6	3.3	3.0	2.8	2.5
40	6.9	6.5	6.2	5.8	5.5	5.1	4.8	4.4	4.1	3.7	3.3
50	8.6	8.2	7.7	7.3	6.8	6.4	6.0	5.5	5.1	4.6	4.1
60	10.3	9.8	9.3	8.7	8.2	7.7	7.1	6.6	6.1	5.5	5.0
70	12.0	11.4	10.8	10.2	9.6	8.9	8.3	7.7	7.1	6.4	5.8
80	13.7	13.0	12.3	11.6	10.9	10.2	9.5	8.8	8.1	7.3	6.6
90	15.4	14.6	13.9	13.1	12.3	11.5	10.7	9.9	9.1	8.3	7.4
100	17.1	16.3	15.4	14.5	13.7	12.8	11.9	11.0	10.1	9.2	8.3
110	18.8	17.9	16.9	16.0	15.0	14.0	13.1	12.1	11.1	10.1	9.1
120	20.5	19.5	18.5	17.4	16.4	15.3	14.2	13.2	12.1	11.0	9.9
130	22.3	21.1	20.0	18.9	17.7	16.6	15.4	14.3	13.1	11.9	10.7
140	24.0	22.8	21.5	20.3	19.1	17.9	16.6	15.4	14.1	12.8	11.5
150	25.7	24.4	23.1	21.8	20.5	19.1	17.8	16.5	15.1	13.7	12.4

AQL=0.08 P0=0.90

N	L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10		1.7	1.6	1.6	1.5	1.4	1.3	1.2	1.1	1.0	0.9	0.8
20		3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.0	1.8	1.6
30		5.2	4.9	4.6	4.4	4.1	3.8	3.5	3.3	3.0	2.7	2.4
40		6.9	6.5	6.2	5.8	5.4	5.1	4.7	4.3	4.0	3.6	3.2
50		8.6	8.2	7.7	7.2	6.8	6.3	5.9	5.4	5.0	4.5	4.1
60		10.3	9.8	9.2	8.7	8.2	7.6	7.1	6.5	6.0	5.4	4.9
70		12.0	11.4	10.8	10.1	9.5	8.9	8.2	7.6	7.0	6.3	5.7
80		13.7	13.0	12.3	11.6	10.9	10.1	9.4	8.7	8.0	7.2	6.5
90		15.5	14.7	13.8	13.0	12.2	11.4	10.6	9.8	8.9	8.1	7.3
100		17.2	16.3	15.4	14.5	13.6	12.7	11.8	10.8	9.9	9.0	8.1
110		18.9	17.9	16.9	15.9	14.9	13.9	12.9	11.9	10.9	9.9	8.9
120		20.6	19.5	18.5	17.4	16.3	15.2	14.1	13.0	11.9	10.8	9.7
130		22.3	21.2	20.0	18.8	17.6	16.5	15.3	14.1	12.9	11.7	10.5
140		24.0	22.8	21.5	20.3	19.0	17.7	16.5	15.2	13.9	12.6	11.3
150		25.8	24.4	23.1	21.7	20.4	19.0	17.6	16.3	14.9	13.5	12.1

AQL=0.10 PO=0.50

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	2.3	2.2	2.2	2.1	2.0	2.0	1.9	1.8	1.8	1.7	1.6
20	4.1	4.0	3.9	3.8	3.7	3.5	3.4	3.3	3.1	3.0	2.9
30	6.0	5.9	5.7	5.5	5.3	5.1	4.9	4.7	4.5	4.3	4.1
40	7.9	7.7	7.5	7.2	7.0	6.7	6.5	6.2	5.9	5.7	5.4
50	9.8	9.5	9.2	9.0	8.6	8.3	8.0	7.7	7.3	7.0	6.6
60	11.7	11.4	11.0	10.7	10.3	9.9	9.5	9.2	8.7	8.3	7.9
70	13.6	13.2	12.8	12.4	12.0	11.5	11.1	10.6	10.1	9.6	9.1
80	15.5	15.1	14.6	14.1	13.6	13.1	12.6	12.1	11.5	11.0	10.4
90	17.4	16.9	16.4	15.9	15.3	14.7	14.2	13.6	12.9	12.3	11.6
100	19.3	18.7	18.2	17.6	17.0	16.3	15.7	15.0	14.4	13.6	12.9
110	21.2	20.6	20.0	19.3	18.6	17.9	17.2	16.5	15.8	15.0	14.2
120	23.1	22.4	21.7	21.0	20.3	19.6	18.8	18.0	17.2	16.3	15.4
130	25.0	24.3	23.5	22.8	22.0	21.2	20.3	19.5	18.6	17.6	16.7
140	26.9	26.1	25.3	24.5	23.6	22.8	21.9	20.9	20.0	19.0	17.9
150	28.8	28.0	27.1	26.2	25.3	24.4	23.4	22.4	21.4	20.3	19.2

AQL=0.10 PO=0.60

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	2.1	2.1	2.0	1.9	1.8	1.8	1.7	1.6	1.5	1.4	1.3
20	4.0	3.9	3.7	3.6	3.4	3.3	3.1	3.0	2.8	2.6	2.5
30	5.9	5.7	5.5	5.3	5.0	4.8	4.6	4.3	4.1	3.8	3.6
40	7.8	7.5	7.2	6.9	6.6	6.3	6.0	5.7	5.4	5.1	4.7
50	9.7	9.3	9.0	8.6	8.3	7.9	7.5	7.1	6.7	6.3	5.9
60	11.6	11.2	10.8	10.3	9.9	9.4	9.0	8.5	8.0	7.5	7.0
70	13.5	13.0	12.5	12.0	11.5	11.0	10.4	9.9	9.3	8.7	8.1
80	15.4	14.8	14.3	13.7	13.1	12.5	11.9	11.3	10.6	10.0	9.3
90	17.3	16.7	16.0	15.4	14.7	14.0	13.4	12.6	11.9	11.2	10.4
100	19.2	18.5	17.8	17.1	16.3	15.6	14.8	14.0	13.2	12.4	11.6
110	21.1	20.3	19.6	18.8	17.9	17.1	16.3	15.4	14.5	13.6	12.7
120	23.0	22.2	21.3	20.4	19.6	18.7	17.7	16.8	15.8	14.9	13.8
130	24.9	24.0	23.1	22.1	21.2	20.2	19.2	18.2	17.1	16.1	15.0
140	26.8	25.8	24.8	23.8	22.8	21.7	20.7	19.6	18.5	17.3	16.1
150	28.7	27.7	26.6	25.5	24.4	23.3	22.1	21.0	19.8	18.5	17.3

AQL=0.10 PO=0.70

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	2.0	1.9	1.9	1.8	1.7	1.6	1.5	1.4	1.4	1.3	1.2
20	3.9	3.8	3.6	3.4	3.3	3.1	2.9	2.8	2.6	2.4	2.2
30	5.8	5.6	5.3	5.1	4.9	4.6	4.4	4.1	3.8	3.6	3.3
40	7.7	7.4	7.1	6.8	6.4	6.1	5.8	5.4	5.1	4.7	4.4
50	9.6	9.2	8.8	8.4	8.0	7.6	7.2	6.8	6.3	5.9	5.5
60	11.5	11.0	10.6	10.1	9.6	9.1	8.6	8.1	7.6	7.1	6.5
70	13.4	12.9	12.3	11.8	11.2	10.6	10.0	9.4	8.8	8.2	7.6
80	15.3	14.7	14.1	13.4	12.8	12.1	11.4	10.8	10.1	9.4	8.7
90	17.2	16.5	15.8	15.1	14.3	13.6	12.9	12.1	11.3	10.5	9.8
100	19.1	18.3	17.5	16.7	15.9	15.1	14.3	13.4	12.6	11.7	10.8
110	21.0	20.2	19.3	18.4	17.5	16.6	15.7	14.8	13.8	12.9	11.9
120	22.9	22.0	21.0	20.1	19.1	18.1	17.1	16.1	15.1	14.0	13.0
130	24.8	23.8	22.8	21.7	20.7	19.6	18.5	17.4	16.3	15.2	14.1
140	26.7	25.6	24.5	23.4	22.3	21.1	19.9	18.8	17.6	16.4	15.1
150	28.6	27.4	26.3	25.1	23.8	22.6	21.4	20.1	18.8	17.5	16.2

AQL=0.10 PO=0.80

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.4	1.3	1.2	1.1
20	3.9	3.7	3.5	3.4	3.2	3.0	2.8	2.7	2.5	2.3	2.1
30	5.8	5.5	5.3	5.0	4.7	4.5	4.2	4.0	3.7	3.4	3.1
40	7.7	7.3	7.0	6.6	6.3	6.0	5.6	5.3	4.9	4.5	4.2
50	9.6	9.1	8.7	8.3	7.9	7.4	7.0	6.6	6.1	5.7	5.2
60	11.5	11.0	10.4	9.9	9.4	8.9	8.4	7.9	7.3	6.8	6.3
70	13.4	12.8	12.2	11.6	11.0	10.4	9.8	9.2	8.5	7.9	7.3
80	15.3	14.6	13.9	13.2	12.5	11.9	11.2	10.5	9.8	9.0	8.3
90	17.2	16.4	15.6	14.9	14.1	13.3	12.6	11.8	11.0	10.2	9.4
100	19.1	18.2	17.4	16.5	15.7	14.8	13.9	13.1	12.2	11.3	10.4
110	21.0	20.0	19.1	18.2	17.2	16.3	15.3	14.4	13.4	12.4	11.4
120	22.9	21.9	20.8	19.8	18.8	17.8	16.7	15.7	14.6	13.6	12.5
130	24.8	23.7	22.6	21.5	20.4	19.2	18.1	17.0	15.8	14.7	13.5
140	26.7	25.5	24.3	23.1	21.9	20.7	19.5	18.3	17.0	15.8	14.6
150	28.6	27.3	26.0	24.8	23.5	22.2	20.9	19.6	18.3	16.9	15.6

AQL=0.10 P0=0.90

N	L/C 0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	1.9	1.8	1.7	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0
20	3.8	3.7	3.5	3.3	3.1	2.9	2.8	2.6	2.4	2.2	2.0
30	5.7	5.5	5.2	4.9	4.7	4.4	4.1	3.9	3.6	3.3	3.1
40	7.6	7.3	6.9	6.6	6.2	5.9	5.5	5.1	4.8	4.4	4.1
50	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.5	5.1
60	11.4	10.9	10.4	9.8	9.3	8.8	8.2	7.7	7.2	6.6	6.1
70	13.3	12.7	12.1	11.5	10.9	10.2	9.6	9.0	8.4	7.7	7.1
80	15.2	14.5	13.8	13.1	12.4	11.7	11.0	10.3	9.6	8.8	8.1
90	17.1	16.3	15.6	14.8	14.0	13.2	12.4	11.6	10.8	10.0	9.1
100	19.0	18.2	17.3	16.4	15.5	14.6	13.7	12.8	12.0	11.1	10.2
110	20.9	20.0	19.0	18.0	17.1	16.1	15.1	14.1	13.1	12.2	11.2
120	22.8	21.8	20.7	19.7	18.6	17.5	16.5	15.4	14.3	13.3	12.2
130	24.7	23.6	22.5	21.3	20.2	19.0	17.9	16.7	15.5	14.4	13.2
140	26.6	25.4	24.2	22.9	21.7	20.5	19.2	18.0	16.7	15.5	14.2
150	28.5	27.2	25.9	24.6	23.3	21.9	20.6	19.3	17.9	16.6	15.2

AQL=0.15 PO=0.60

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	2.8	2.7	2.7	2.6	2.6	2.5	2.4	2.4	2.3	2.2	2.2
20	5.3	5.2	5.0	4.9	4.8	4.7	4.5	4.4	4.3	4.1	4.0
30	7.8	7.6	7.4	7.2	7.0	6.9	6.7	6.5	6.3	6.1	5.8
40	10.3	10.0	9.8	9.5	9.3	9.0	8.8	8.5	8.2	8.0	7.7
50	12.7	12.5	12.2	11.9	11.5	11.2	10.9	10.6	10.2	9.9	9.5
60	15.2	14.9	14.5	14.2	13.8	13.4	13.0	12.6	12.2	11.8	11.4
70	17.7	17.3	16.9	16.5	16.0	15.6	15.2	14.7	14.2	13.7	13.2
80	20.2	19.8	19.3	18.8	18.3	17.8	17.3	16.8	16.2	15.7	15.1
90	22.7	22.2	21.7	21.1	20.6	20.0	19.4	18.8	18.2	17.6	17.0
100	25.2	24.6	24.0	23.4	22.8	22.2	21.5	20.9	20.2	19.5	18.8
110	27.7	27.1	26.4	25.7	25.1	24.4	23.7	22.9	22.2	21.4	20.7
120	30.2	29.5	28.8	28.1	27.3	26.6	25.8	25.0	24.2	23.4	22.5
130	32.7	31.9	31.2	30.4	29.6	28.7	27.9	27.1	26.2	25.3	24.4
140	35.2	34.4	33.5	32.7	31.8	30.9	30.0	29.1	28.2	27.2	26.2
150	37.7	36.8	35.9	35.0	34.1	33.1	32.2	31.2	30.2	29.1	28.1

AQL=0.15 PO=0.70

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	2.6	2.5	2.5	2.4	2.3	2.2	2.2	2.1	2.0	1.9	1.8
20	5.0	4.9	4.7	4.6	4.5	4.3	4.1	4.0	3.8	3.7	3.5
30	7.5	7.2	7.0	6.8	6.6	6.4	6.1	5.9	5.7	5.4	5.2
40	9.9	9.6	9.3	9.0	8.7	8.4	8.1	7.8	7.5	7.2	6.9
50	12.3	12.0	11.6	11.3	10.9	10.5	10.1	9.7	9.4	9.0	8.6
60	14.8	14.3	13.9	13.5	13.0	12.6	12.1	11.7	11.2	10.7	10.3
70	17.2	16.7	16.2	15.7	15.2	14.7	14.1	13.6	13.0	12.5	11.9
80	19.6	19.1	18.5	17.9	17.3	16.7	16.1	15.5	14.9	14.3	13.6
90	22.1	21.4	20.8	20.1	19.5	18.8	18.1	17.4	16.7	16.0	15.3
100	24.5	23.8	23.1	22.3	21.6	20.9	20.1	19.4	18.6	17.8	17.0
110	26.9	26.1	25.4	24.6	23.8	22.9	22.1	21.3	20.4	19.6	18.7
120	29.4	28.5	27.7	26.8	25.9	25.0	24.1	23.2	22.3	21.3	20.4
130	31.8	30.9	29.9	29.0	28.0	27.1	26.1	25.1	24.1	23.1	22.0
140	34.2	33.2	32.2	31.2	30.2	29.2	28.1	27.0	25.9	24.8	23.7
150	36.7	35.6	34.5	33.4	32.3	31.2	30.1	29.0	27.8	26.6	25.4

AQL=0.15 PO=0.80

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	2.5	2.4	2.3	2.2	2.2	2.1	2.0	1.9	1.8	1.7	1.7
20	4.9	4.7	4.6	4.4	4.2	4.1	3.9	3.7	3.6	3.4	3.2
30	7.3	7.0	6.8	6.6	6.3	6.1	5.8	5.6	5.3	5.1	4.8
40	9.7	9.3	9.0	8.7	8.4	8.1	7.7	7.4	7.1	6.8	6.4
50	12.1	11.7	11.3	10.9	10.5	10.1	9.7	9.3	8.8	8.4	8.0
60	14.4	14.0	13.5	13.0	12.6	12.1	11.6	11.1	10.6	10.1	9.6
70	16.8	16.3	15.7	15.2	14.6	14.1	13.5	12.9	12.4	11.8	11.2
80	19.2	18.6	18.0	17.4	16.7	16.1	15.4	14.8	14.1	13.5	12.8
90	21.6	20.9	20.2	19.5	18.8	18.1	17.3	16.6	15.9	15.1	14.4
100	24.0	23.2	22.5	21.7	20.9	20.1	19.3	18.4	17.6	16.8	16.0
110	26.4	25.6	24.7	23.8	23.0	22.1	21.2	20.3	19.4	18.5	17.6
120	28.8	27.9	26.9	26.0	25.0	24.1	23.1	22.1	21.1	20.1	19.2
130	31.2	30.2	29.2	28.1	27.1	26.1	25.0	24.0	22.9	21.8	20.7
140	33.6	32.5	31.4	30.3	29.2	28.1	26.9	25.8	24.7	23.5	22.3
150	36.0	34.8	33.7	32.5	31.3	30.1	28.9	27.6	26.4	25.2	23.9

AQL=0.15 PO=0.90

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	2.4	2.3	2.2	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.6
20	4.8	4.6	4.4	4.3	4.1	3.9	3.8	3.6	3.4	3.3	3.1
30	7.1	6.9	6.6	6.4	6.1	5.9	5.6	5.4	5.1	4.9	4.6
40	9.5	9.2	8.8	8.5	8.2	7.8	7.5	7.2	6.8	6.5	6.2
50	11.9	11.5	11.0	10.6	10.2	9.8	9.4	9.0	8.5	8.1	7.7
60	14.2	13.7	13.3	12.8	12.3	11.8	11.3	10.8	10.2	9.7	9.2
70	16.6	16.0	15.5	14.9	14.3	13.7	13.1	12.5	12.0	11.4	10.8
80	19.0	18.3	17.7	17.0	16.3	15.7	15.0	14.3	13.7	13.0	12.3
90	21.3	20.6	19.9	19.1	18.4	17.6	16.9	16.1	15.4	14.6	13.8
100	23.7	22.9	22.1	21.2	20.4	19.6	18.7	17.9	17.1	16.2	15.4
110	26.1	25.2	24.3	23.4	22.4	21.5	20.6	19.7	18.8	17.8	16.9
120	28.5	27.5	26.5	25.5	24.5	23.5	22.5	21.5	20.5	19.5	18.4
130	30.8	29.8	28.7	27.6	26.5	25.4	24.4	23.3	22.2	21.1	20.0
140	33.2	32.0	30.9	29.7	28.6	27.4	26.2	25.1	23.9	22.7	21.5
150	35.6	34.3	33.1	31.8	30.6	29.3	28.1	26.8	25.6	24.3	23.0

AQL=0.20 P0=0.60

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	3.6	3.5	3.5	3.4	3.4	3.3	3.3	3.2	3.2	3.1	3.1
20	6.7	6.6	6.5	6.4	6.3	6.3	6.2	6.1	6.0	5.9	5.8
30	9.9	9.7	9.6	9.5	9.3	9.2	9.0	8.9	8.7	8.6	8.4
40	13.0	12.9	12.7	12.5	12.3	12.1	11.9	11.7	11.5	11.3	11.1
50	16.2	16.0	15.8	15.5	15.3	15.1	14.8	14.6	14.3	14.1	13.8
60	19.4	19.1	18.8	18.6	18.3	18.0	17.7	17.4	17.1	16.8	16.5
70	22.6	22.3	21.9	21.6	21.3	20.9	20.6	20.2	19.9	19.5	19.2
80	25.7	25.4	25.0	24.6	24.3	23.9	23.5	23.1	22.7	22.3	21.8
90	28.9	28.5	28.1	27.7	27.2	26.8	26.4	25.9	25.5	25.0	24.5
100	32.1	31.6	31.2	30.7	30.2	29.7	29.3	28.8	28.2	27.7	27.2
110	35.3	34.8	34.3	33.7	33.2	32.7	32.1	31.6	31.0	30.5	29.9
120	38.4	37.9	37.3	36.8	36.2	35.6	35.0	34.4	33.8	33.2	32.6
130	41.6	41.0	40.4	39.8	39.2	38.6	37.9	37.3	36.6	35.9	35.3
140	44.8	44.2	43.5	42.9	42.2	41.5	40.8	40.1	39.4	38.7	37.9
150	48.0	47.3	46.6	45.9	45.2	44.4	43.7	43.0	42.2	41.4	40.6

AQL=0.20 P0=0.70

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	3.3	3.2	3.1	3.1	3.0	2.9	2.9	2.8	2.7	2.7	2.6
20	6.3	6.1	6.0	5.9	5.8	5.6	5.5	5.4	5.2	5.1	4.9
30	9.3	9.1	8.9	8.7	8.5	8.3	8.1	7.9	7.7	7.5	7.3
40	12.3	12.0	11.8	11.5	11.3	11.0	10.8	10.5	10.2	10.0	9.7
50	15.3	15.0	14.7	14.4	14.1	13.7	13.4	13.1	12.7	12.4	12.0
60	18.3	18.0	17.6	17.2	16.8	16.4	16.0	15.6	15.2	14.8	14.4
70	21.4	20.9	20.5	20.0	19.6	19.1	18.7	18.2	17.7	17.3	16.8
80	24.4	23.9	23.4	22.9	22.4	21.8	21.3	20.8	20.3	19.7	19.1
90	27.4	26.8	26.3	25.7	25.1	24.6	24.0	23.4	22.8	22.1	21.5
100	30.4	29.8	29.2	28.5	27.9	27.3	26.6	25.9	25.3	24.6	23.9
110	33.4	32.8	32.1	31.4	30.7	30.0	29.2	28.5	27.8	27.0	26.2
120	36.5	35.7	35.0	34.2	33.4	32.7	31.9	31.1	30.3	29.5	28.6
130	39.5	38.7	37.9	37.0	36.2	35.4	34.5	33.7	32.8	31.9	31.0
140	42.5	41.6	40.8	39.9	39.0	38.1	37.2	36.2	35.3	34.3	33.4
150	45.5	44.6	43.7	42.7	41.8	40.8	39.8	38.8	37.8	36.8	35.7

AQL=0.20 P0=0.80

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	3.0	3.0	2.9	2.8	2.7	2.7	2.6	2.5	2.4	2.4	2.3
20	5.9	5.8	5.7	5.5	5.4	5.2	5.1	4.9	4.8	4.6	4.5
30	8.9	8.6	8.4	8.2	8.0	7.8	7.5	7.3	7.1	6.9	6.6
40	11.8	11.5	11.2	10.9	10.6	10.3	10.0	9.7	9.4	9.1	8.8
50	14.7	14.3	14.0	13.6	13.2	12.9	12.5	12.1	11.7	11.4	11.0
60	17.6	17.2	16.7	16.3	15.9	15.4	15.0	14.5	14.1	13.6	13.2
70	20.5	20.0	19.5	19.0	18.5	18.0	17.5	16.9	16.4	15.9	15.3
80	23.4	22.9	22.3	21.7	21.1	20.5	19.9	19.3	18.7	18.1	17.5
90	26.3	25.7	25.1	24.4	23.7	23.1	22.4	21.7	21.1	20.4	19.7
100	29.3	28.5	27.8	27.1	26.4	25.6	24.9	24.1	23.4	22.6	21.9
110	32.2	31.4	30.6	29.8	29.0	28.2	27.4	26.5	25.7	24.9	24.0
120	35.1	34.2	33.4	32.5	31.6	30.7	29.8	29.0	28.0	27.1	26.2
130	38.0	37.1	36.1	35.2	34.2	33.3	32.3	31.4	30.4	29.4	28.4
140	40.9	39.9	38.9	37.9	36.9	35.8	34.8	33.8	32.7	31.6	30.6
150	43.8	42.8	41.7	40.6	39.5	38.4	37.3	36.2	35.0	33.9	32.7

AQL=0.20 P0=0.90

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	2.9	2.8	2.7	2.7	2.6	2.5	2.4	2.3	2.3	2.2	2.1
20	5.7	5.6	5.4	5.3	5.1	5.0	4.8	4.6	4.5	4.3	4.2
30	8.6	8.3	8.1	7.9	7.6	7.4	7.2	6.9	6.7	6.5	6.2
40	11.4	11.1	10.8	10.5	10.2	9.9	9.6	9.2	8.9	8.6	8.3
50	14.3	13.9	13.5	13.1	12.7	12.3	11.9	11.5	11.1	10.8	10.4
60	17.1	16.6	16.2	15.7	15.2	14.8	14.3	13.8	13.4	12.9	12.4
70	19.9	19.4	18.9	18.3	17.8	17.2	16.7	16.1	15.6	15.0	14.5
80	22.8	22.2	21.6	20.9	20.3	19.7	19.1	18.4	17.8	17.2	16.6
90	25.6	24.9	24.2	23.6	22.9	22.2	21.5	20.7	20.0	19.3	18.6
100	28.5	27.7	26.9	26.2	25.4	24.6	23.8	23.0	22.3	21.5	20.7
110	31.3	30.5	29.6	28.8	27.9	27.1	26.2	25.3	24.5	23.6	22.7
120	34.2	33.2	32.3	31.4	30.5	29.5	28.6	27.7	26.7	25.8	24.8
130	37.0	36.0	35.0	34.0	33.0	32.0	31.0	30.0	28.9	27.9	26.9
140	39.9	38.8	37.7	36.6	35.5	34.4	33.3	32.3	31.2	30.1	28.9
150	42.7	41.5	40.4	39.2	38.1	36.9	35.7	34.6	33.4	32.2	31.0

AQL=0.25 PO=0.70

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	4.0	3.9	3.9	3.8	3.8	3.7	3.7	3.6	3.5	3.5	3.4
20	7.6	7.5	7.4	7.3	7.2	7.1	7.0	6.9	6.8	6.7	6.6
30	11.3	11.1	11.0	10.8	10.7	10.5	10.3	10.2	10.0	9.8	9.7
40	14.9	14.7	14.5	14.3	14.1	13.9	13.7	13.5	13.3	13.0	12.8
50	18.6	18.4	18.1	17.8	17.6	17.3	17.1	16.8	16.5	16.2	15.9
60	22.3	22.0	21.7	21.4	21.0	20.7	20.4	20.1	19.8	19.4	19.1
70	26.0	25.6	25.2	24.9	24.5	24.1	23.8	23.4	23.0	22.6	22.2
80	29.6	29.2	28.8	28.4	28.0	27.6	27.1	26.7	26.2	25.8	25.3
90	33.3	32.8	32.4	31.9	31.4	31.0	30.5	30.0	29.5	29.0	28.5
100	37.0	36.5	35.9	35.4	34.9	34.4	33.8	33.3	32.7	32.2	31.6
110	40.6	40.1	39.5	38.9	38.4	37.8	37.2	36.6	36.0	35.4	34.7
120	44.3	43.7	43.1	42.5	41.8	41.2	40.5	39.9	39.2	38.6	37.9
130	48.0	47.3	46.7	46.0	45.3	44.6	43.9	43.2	42.5	41.7	41.0
140	51.6	50.9	50.2	49.5	48.8	48.0	47.3	46.5	45.7	44.9	44.1
150	55.3	54.6	53.8	53.0	52.2	51.4	50.6	49.8	49.0	48.1	47.3

AQL=0.25 PO=0.80

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	3.6	3.6	3.5	3.4	3.4	3.3	3.2	3.2	3.1	3.0	2.9
20	7.1	6.9	6.8	6.7	6.6	6.4	6.3	6.2	6.0	5.9	5.7
30	10.5	10.3	10.2	10.0	9.8	9.6	9.4	9.2	9.0	8.8	8.5
40	14.0	13.8	13.5	13.2	13.0	12.7	12.4	12.2	11.9	11.6	11.3
50	17.5	17.2	16.8	16.5	16.2	15.8	15.5	15.2	14.8	14.5	14.2
60	20.9	20.6	20.2	19.8	19.4	19.0	18.6	18.2	17.8	17.4	17.0
70	24.4	24.0	23.5	23.1	22.6	22.1	21.7	21.2	20.7	20.2	19.8
80	27.9	27.4	26.8	26.3	25.8	25.3	24.7	24.2	23.7	23.1	22.6
90	31.3	30.8	30.2	29.6	29.0	28.4	27.8	27.2	26.6	26.0	25.4
100	34.8	34.2	33.5	32.9	32.2	31.6	30.9	30.2	29.5	28.9	28.2
110	38.3	37.6	36.9	36.1	35.4	34.7	34.0	33.2	32.5	31.7	31.0
120	41.7	41.0	40.2	39.4	38.6	37.8	37.0	36.2	35.4	34.6	33.8
130	45.2	44.4	43.5	42.7	41.8	41.0	40.1	39.2	38.4	37.5	36.6
140	48.7	47.8	46.9	46.0	45.1	44.1	43.2	42.3	41.3	40.4	39.4
150	52.1	51.2	50.2	49.2	48.3	47.3	46.3	45.3	44.3	43.2	42.2

AQL=0.25 P0=0.90

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	3.4	3.3	3.2	3.2	3.1	3.0	3.0	2.9	2.8	2.7	2.7
20	6.7	6.6	6.4	6.3	6.1	6.0	5.9	5.7	5.6	5.4	5.3
30	10.1	9.8	9.6	9.4	9.2	9.0	8.8	8.5	8.3	8.1	7.9
40	13.4	13.1	12.8	12.5	12.2	11.9	11.7	11.4	11.1	10.8	10.5
50	16.7	16.4	16.0	15.6	15.3	14.9	14.6	14.2	13.8	13.5	13.1
60	20.1	19.6	19.2	18.8	18.3	17.9	17.5	17.0	16.6	16.2	15.7
70	23.4	22.9	22.4	21.9	21.4	20.9	20.4	19.9	19.3	18.8	18.3
80	26.7	26.1	25.6	25.0	24.4	23.8	23.3	22.7	22.1	21.5	20.9
90	30.1	29.4	28.8	28.1	27.5	26.8	26.2	25.5	24.9	24.2	23.5
100	33.4	32.7	32.0	31.2	30.5	29.8	29.1	28.3	27.6	26.9	26.2
110	36.7	35.9	35.1	34.4	33.6	32.8	32.0	31.2	30.4	29.6	28.8
120	40.1	39.2	38.3	37.5	36.6	35.7	34.9	34.0	33.1	32.3	31.4
130	43.4	42.5	41.5	40.6	39.7	38.7	37.8	36.8	35.9	34.9	34.0
140	46.7	45.7	44.7	43.7	42.7	41.7	40.7	39.7	38.6	37.6	36.6
150	50.1	49.0	47.9	46.8	45.8	44.7	43.6	42.5	41.4	40.3	39.2

AQL=0.30 P0=0.80

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	4.2	4.2	4.1	4.1	4.0	4.0	3.9	3.9	3.8	3.7	3.7
20	8.3	8.2	8.1	8.0	7.9	7.7	7.6	7.5	7.4	7.3	7.2
30	12.4	12.2	12.0	11.9	11.7	11.5	11.3	11.2	11.0	10.8	10.6
40	16.4	16.2	16.0	15.8	15.5	15.3	15.1	14.8	14.6	14.4	14.1
50	20.5	20.2	19.9	19.6	19.4	19.1	18.8	18.5	18.2	17.9	17.6
60	24.6	24.2	23.9	23.5	23.2	22.9	22.5	22.2	21.8	21.4	21.1
70	28.6	28.2	27.8	27.4	27.0	26.6	26.2	25.8	25.4	25.0	24.6
80	32.7	32.2	31.8	31.3	30.9	30.4	30.0	29.5	29.0	28.5	28.1
90	36.7	36.2	35.7	35.2	34.7	34.2	33.7	33.2	32.6	32.1	31.5
100	40.8	40.3	39.7	39.1	38.6	38.0	37.4	36.8	36.2	35.6	35.0
110	44.9	44.3	43.6	43.0	42.4	41.8	41.1	40.5	39.8	39.2	38.5
120	48.9	48.3	47.6	46.9	46.2	45.5	44.8	44.1	43.4	42.7	42.0
130	53.0	52.3	51.5	50.8	50.1	49.3	48.6	47.8	47.0	46.3	45.5
140	57.1	56.3	55.5	54.7	53.9	53.1	52.3	51.5	50.7	49.8	49.0
150	61.1	60.3	59.5	58.6	57.8	56.9	56.0	55.1	54.3	53.4	52.5

AQL=0.30 P0=0.90

N \ L/C	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
10	3.9	3.8	3.8	3.7	3.6	3.6	3.5	3.4	3.4	3.3	3.2
20	7.7	7.6	7.5	7.3	7.2	7.1	6.9	6.8	6.7	6.5	6.4
30	11.6	11.4	11.2	11.0	10.8	10.6	10.4	10.2	10.0	9.8	9.6
40	15.4	15.2	14.9	14.6	14.4	14.1	13.8	13.6	13.3	13.0	12.8
50	19.2	18.9	18.6	18.3	17.9	17.6	17.3	16.9	16.6	16.3	15.9
60	23.1	22.7	22.3	21.9	21.5	21.1	20.7	20.3	19.9	19.5	19.1
70	26.9	26.5	26.0	25.5	25.1	24.6	24.2	23.7	23.2	22.7	22.3
80	30.8	30.2	29.7	29.2	28.7	28.1	27.6	27.1	26.5	26.0	25.4
90	34.6	34.0	33.4	32.8	32.2	31.6	31.0	30.4	29.8	29.2	28.6
100	38.4	37.8	37.1	36.5	35.8	35.1	34.5	33.8	33.1	32.5	31.8
110	42.3	41.5	40.8	40.1	39.4	38.6	37.9	37.2	36.4	35.7	35.0
120	46.1	45.3	44.5	43.7	43.0	42.2	41.4	40.6	39.8	38.9	38.1
130	49.9	49.1	48.2	47.4	46.5	45.7	44.8	43.9	43.1	42.2	41.3
140	53.8	52.9	51.9	51.0	50.1	49.2	48.2	47.3	46.4	45.4	44.5
150	57.6	56.6	55.7	54.7	53.7	52.7	51.7	50.7	49.7	48.7	47.7

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